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PLANETARY PHENOMENA FOR SEPTEMBER AND OCTOBER, 1898.

By Professor Malcolm McNeill.

September.

The Sun crosses the equator and autumn begins September, 22d, 4 P.M., P. S. T.

Mercury passes inferior conjunction on September 5th, and moves rapidly out toward greatest western elongation, which it reaches on September 21st. It may be seen as a morning star in the eastern twilight during the latter half of the month.

Venus is still an evening star and comes to greatest elongation on September 22d. Throughout the month it sets less than two hours after sunset. When a greatest eastern elongation occurs in the spring, the planet remains above the horizon more than twice as long after sunset. The reason for the difference is, that for an eastern elongation in the spring, the planet is far north of the Sun, and in the autumn it is far south, nineteen degrees on September 30th.

Mars is getting into more convenient position for observation, rising before midnight on September 1st, and nearly an hour earlier at the close of the month. It moves nineteen degrees eastward during the month through the constellation *Gemini*, and at the close of the month is only one degree from the third magnitude star δ *Geminorum*. The Moon makes a very close approach to *Mars* on the morning of September 9th, but will hardly occult it in this country, except possibly in the extreme southwestern portions. The planet is beginning to grow more conspicuous, and its distance from the Earth diminishes from 137,000,000 miles to 120,000,000 during the month.

Jupiter is still an evening star, but its distance from the Sun is rapidly diminishing, and it will scarcely be possible to see it with the naked eye after the first half of the month. It moves eastward and southward about seven degrees during the month, and is in the western part of the constellation *Virgo*, not far from *Spica*, the brightest star of the constellation.

Saturn is also an evening star and sets at 8:36 P.M., September 30th. It is in the constellation *Scorpio*, about seven degrees to the north of the first magnitude red star *Antares*, and moves about two degrees eastward and southward during the month.

Uranus precedes *Saturn*, setting about half an hour earlier. It is not bright enough to be easily seen at the low altitude it reaches before the disappearance of the evening twilight.

Neptune is on the border on the constellations *Taurus* and *Gemini*, and rises before 10 P.M. at the end of the month.

OCTOBER.

Mercury remains a morning star until October 19th, when it passes superior conjunction and becomes an evening star. It may be seen in the early twilight for a few days after the beginning of the month, but it soon reaches a point too near the Sun for naked-eye observation.

Venus is an evening star. It is at its greatest possible southern latitude as seen from the Sun on October 9th, and this, combined with its position in regard to the ecliptic as seen from the Earth, gives it its nearly maximum southern declination. At the end of the month, it sets only an hour and a half after sunset. During October and November it will be very bright, the time of greatest brilliancy being about the end of October. For several weeks before and after that time, it will be bright enough to be seen in full daylight with the naked eye, if the low altitude of the planet due to its great southern declination does not interfere too much.

Mars rises about an hour earlier than during September, at a little after 10 P.M. on October 31st. It is in quadrature with the Sun on October 17th. It moves about fifteen degrees eastward and two degrees southward during the month through the constellation *Gemini* into *Cancer*. At the end of the month it will have diminished its distance from the Earth to less than 100,000,000 miles, and its brightness will increase about forty per cent during the month.

Jupiter begins the month as an evening star, too near the Sun to be seen without a telescope, and passes conjunction on October 13th. Toward the close of the month, it rises more than an hour before sunrise, the interval between the rising of the planet and Sun increasing quite rapidly, owing to the rapid motion of the Sun eastward and southward.

Saturn is still an evening star, but is not in very good position for observation, owing to its nearness to the Sun and its low altitude after sunset. At the end of the month, it sets less than two hours after the Sun.

Uranus is also an evening star, but as it sets half an hour earlier than *Saturn*, and is so faint, it can scarcely be seen without a telescope.

Neptune rises two hours earlier than in September, and is on the border of the constellations *Taurus* and *Gemini*.

Phases of the Moon, P. S. T.

		H. M.
Last Quarter,	Sept. 7,	2 51 P. M.
New Moon,	Sept. 15,	4 10 P. M.
First Quarter,	Sept. 22,	6 39 P. M.
Full Moon,	Sept. 29,	3 10 P. M.
Last Quarter,	Oct. 7,	10 5 A. M.
New Moon,	Oct. 15,	4 37 A. M.
First Quarter,	Oct. 22,	1 9 A. M.
Full Moon,	Oct. 29,	4 18 A. M.

The Sun.

1898.	R. A. H. M.	Declination. °	Rises. H. M.	Transits. H. M.	Sets. H. M.
Sept. 1.	10 43	+ 8 11	5 32 A. M.	12 0 M.	6 28 P.M.
11.	11 19	+ 4 27	5 41	11 56 A.M.	6 11
21.	11 55	+ 0 36	5 51	11 53	5 55
Oct. 1.	12 31	− 3 18	6 1	11 50	5 39
11.	13 7	− 7 8	6 11	11 47	5 23
21.	13 44	− 10 49	6 22	11 45	5 8
31.	14 23	− 14 13	6 33	11 44	4 55

Mercury.

Sept. 1.	11 6	+ 1 4	6 20 A.M.	12 23 P.M.	6 26 P.M.
11.	10 37	+ 6 31	4 53	11 15 A.M.	5 37
21.	10 50	+ 8 20	4 20	10 48	5 16
Oct. 1.	11 44	+ 3 49	4 51	11 3	5 15
11.	12 48	− 3 28	5 38	11 27	5 16
21.	13 50	− 10 44	6 27	11 50	5 13
31.	14 51	− 17 2	7 11	12 12 P.M.	5 13

Venus.

Sept. 1.	13 28	− 10 45	9 22 A.M.	2 45 P.M.	8 8 P.M.
11.	14 7	− 15 18	9 38	2 45	7 52
21.	14 46	− 19 21	9 53	2 45	7 37
Oct. 1.	15 24	− 22 45	10 5	2 43	7 21
11.	15 59	− 25 21	10 13	2 39	7 5
21.	16 30	− 27 6	10 11	2 30	6 49
31.	16 53	− 27 55	9 59	2 13	6 27

Mars.

Sept. 1.	5 56	+23 28	11 49 P.M.	7 14 A.M.	2 39 P.M.
11.	6 23	+23 33	11 35	7 1	2 27
21.	6 48	+23 24	11 21	6 46	2 11
Oct. 1.	7 11	+23 4	11 8	6 31	1 54
11.	7 33	+22 36	10 52	6 13	1 34
21.	7 53	+22 4	10 35	5 54	1 13
31.	8 11	+21 31	10 15	5 32	12 49

Jupiter.

Sept. 1.	12 45	− 3 35	8 14 A.M.	2 2 P.M.	7 50 P.M.
Oct. 1.	13 8	− 6 2	6 47	12 27	6 7
31.	13 32	− 8 28	5 22	10 53 A.M.	4 24

Saturn.

Sept. 1.	16 18	−19 43	12 46 P.M.	5 34 P.M.	10 22 P.M.
Oct. 1.	16 25	−20 7	10 55 A.M.	3 44	8 33
31.	16 37	−20 37	9 10	1 57	6 44

Uranus.

Sept. 1.	15 50	−19 58	12 18 P.M.	5 7 P.M.	9 56 P.M.
Oct. 1.	15 54	−20 11	10 25 A.M.	3 13	8 1
31.	16 1	−20 30	8 34	1 21	6 8

Neptune

Sept. 1.	5 37	+22 2	11 35 P.M.	6 54 A.M.	2 13 P.M.
Oct. 1.	5 38	+22 1	9 39	4 58	12 17
31.	5 36	+22 0	7 39	2 58	10 17 A.M.